UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,587	10/01/2003	Uwe-Jens Krabbenhoft	HK-771	7984

24131   7590   11/06/2009
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ART UNIT	PAPER NUMBER
2625	

MAIL DATE	DELIVERY MODE
11/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2009*.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 and 5-8* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☒ Claim(s) *5-8* is/are allowed.
6)☒ Claim(s) *1,3* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
        1.☐ Certified copies of the priority documents have been received.
        2.☐ Certified copies of the priority documents have been received in Application No. _____.
        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

> 1.   Determining the scope and contents of the prior art.
> 2.   Ascertaining the differences between the prior art and the claims at issue.
> 3.   Resolving the level of ordinary skill in the pertinent art.
> 4.   Considering objective evidence present in the application indicating
>   obviousness or nonobviousness.

3.   Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over

DECKER [US Patent 6,281,984 B1] in view of **FISCHER [US Patent 7,057,765 B1]**,

ROLLESTON [US Patent 5,483,360], and **BALASUBRAMANIAN [US Patent**

6,744,534 B1], and **TSUKADA [US Patent 5,774,238].**

As for claim 1, DECKER teaches a method for producing a printing process adaptation

with which color values of a *first printing process* are converted into color values of a

second printing process so that black build-up of the first printing process being

substantially transferred into the second printing process and *visual impressions* of

printed colors in the first and second printing processes being substantially identical

[DECKER's invention converts an "externally defined four dimensional colorant

(CMYK) into an equivalent four dimensional colorant (C'M'Y'K') that takes into

consideration the colors and capabilities of the given printer that is to perform the

printing functions"; **col. 6, lines 43 – 47.**

The *externally defined CMYK* corresponds to the instant application's *color*

values of a first printing process, and the *equivalent C'M'Y'K'* corresponds to the

instant application's *color values of a second printing process.*],

which comprises the steps of:

performing a first printing process adaptation without maintaining the

black build-up for transforming all the color values of the first printing

process into transformed color values of the second printing process;

performing a second printing process adaptation while maintaining the

black build-up for transforming all the color values of the first printing

process into further transformed color values of the second printing

process

[*In a manner similar to the instant application*, DECKER teaches the generation

of a color transform table, CMYK → C'M'Y'K'; **col. 11, line 25**.

The black (K) channel is maintained by means of a transform, K → L* → K'; **col.

11, lines 21 – 22.** DECKER explains, "A K value from the standard (where C=0,

M=0, and Y=0) is used along with its corresponding L* value. This L* value is

then used to determine a corresponding K' value for the printer"; **col. 9, lines 43

– 46.**

"For example, if the standard has a specified L* value for C=0, M=0, Y=0, and

K=0.20, the converted K' value, (*which has the same L* value*), for the printer

may be K'=0.22. Likewise, for each of the incremental percentages used by the

standard for the K value, an equivalent K' value for the printer is determined";

col. 10, lines 10 – 16.

Next, DECKER teaches printing and measuring a *first group* of patches having

"predetermined combinations of varying percentages of cyan, magenta, and

yellow at K'=0"; **col. 10, lines 19 – 21.**

This is followed by the printing and measuring of a *second group* of patches with

varying percentages of black (K'); **col. 10, lines 35 – 39.** "For example, if K' was

determined to be 0.11", the patches of "cyan, magenta, and yellow printed out by

the printer would be printed out with black (K') at 11% instead of 10%. The L*a*b* of each of these patches are measured to get a transformation relationship from L*a*b* to (C'M'Y')K' of the printer but with K'=0.11"; **col. 10, lines 46 – 52.**

From the *first* and *second group of patches*, "all of these L*a*b* values are inputted into an inversion/interpolation program 108 to create a lookup table, 110. There may be several lookup tables created, where one lookup table is created for each value of K (K')"; **col. 11, lines 2 – 5.** In **col. 11, lines 6 – 20**, DECKER illustrates two CMY → C'M'Y' tables for K=0/K'=0 and K=0.10/K'=0.11. However, as noted there may be several such lookup tables.

As previously noted, these tables are then combined with the transform, K → L* → K' [**col. 11, lines 21 - 22**] to form color transform table CMYK → C'M'Y'K'; **col. 11, lines 24 - 26];**

performing a third printing process adaptation for transforming all the color values of the first printing process into additional transformed color values of the second printing process by performing a weighted averaging of the transformed color values of the first printing process adaptation and of the further transformed color values of the second printing process adaptation;

carrying out the weighted averaging with a weighting function f(C1,M1,Y1)

derived from a proportion of chromatic printing inks <u>CMY</u> in colors of the

first printing process;

and using a function s(C1,M1,Y1) for forming the weighting function

f(C1,M1,Y1), which is limited to a value range between 0 and 1,

the function s(C1,M1,Y1) being a measure of an entire proportion of <u>only</u>

the chromatic printing inks CMY <u>without black</u> in a color [[from]] <u>of</u> the first

printing process.

However, DECKER *does not specifically teach*

performing a first printing process adaptation without maintaining the

black build-up for transforming all the color values of the first printing

process into transformed color values of the second printing process;

performing a third printing process adaptation for transforming all the

color values of the first printing process into additional transformed color

values of the second printing process by performing a weighted averaging

of the transformed color values of the first printing process adaptation and

of the further transformed color values of the second printing process

adaptation;

FISCHER's invention is "directed to a system and method for constrained multi-dimensional color transformation"; **col. 1, lines 51 – 52.** "With a constrained multi-dimensional color transformation, <u>a destination device</u>, such as a color proofer, can provide an accurate color match relative to <u>a source or 'target' device</u>, such as a printing press. In particular the constraints can *preserve selected color information* that is present in an image produced by the source device, and prevent addition of other selected color information that would not be present in the source device image"; **col. 1, lines 60 – 67.**

FISCHER's *source or target device,* and *destination device* correspond respectively to the instant application's *first printing process,* and *second printing process.* That is, like DECKER, FISCHER teaches a color transformation of CMYK color values of a *first printing process* into C'M'Y'K color values of a *second printing process.*

However, unlike DECKER, and <u>*similar to the instant application*</u>, FISCHER replaces the printing and measuring of color patches with an iterative search of the "forward models" of the device profiles of the first and second printing processes. FISCHER cites, "To produce destination data in destination device-dependent coordinates, e.g., CMYK, processor 12 performs a search of destination device-dependent coordinates that, when

applied to the forward model for the destination device, approximate the device-independent coordinates generated for the source data"; **col. 4, lines 27 - 33.** In addition, a "search module 28 seeks destination device coordinates that minimize the calculated error" [**col. 4, lines 45 - 46**] between "the device-independent coordinates for the source device and those for the destination device"; **col. 4, lines 41 – 43.** "The process continues in an iterative manner until the calculated error is reduced to an acceptable degree"; **col. 4, lines 46 – 48.**

As with the instant application, FISCHER teaches that "*unconstrained* multi-dimensional transforms, *such as are typical of ICC device link profiles*, can provide excellent color fidelity but may add or remove dots with respect to the proofing target"; **col. 8, lines 21 – 24.** "In particular, *unconstrained* multi-dimensional transformation can result in substitution and removal of particular colorants in the destination image relative to the colors specified in the source image"; **col. 2, lines 7 – 11.**

FISCHER's *unconstrained multi-dimensional transform* (e.g., a typical ICC device link profile) corresponds to the instant application's first printing process adaptation.

Contrary to an *unconstrained* multi-dimensional color transformation (e.g., a typical ICC device link profile), FISCHER teaches that a *constrained multi-dimensional transform (CMT)* "preserves the presence and absence of colorants from input to output, and provides more accurate color matching"; **col. 2, lines 23 – 25.** FISCHER further cites,

"For a CMYK source to CMYK destination transformation, the K versus CMY tradeoff can be constrained by *maintaining the integrity of the black channel*"; **col. 5, lines 40 – 43.**

FISCHER's *constrained multi-dimensional transform (CMT)* which maintains the integrity of the black channel corresponds to the second printing process adaptation as taught by both DECKER and by the instant application.

FISCHER further teaches that a "*smooth transition*" (corresponding to the instant application's third printing process adaptation) "can be implemented … by *interpolating* between the constrained and unconstrained cases"; **col. 7, lines 33 – 35.**

ROLLESTON teaches a method of producing a *blended* color transform that achieves a *smooth transition* between two or more separate color transforms. ROLLESTON's method generates "a color space transform lookup table derived from printer calibration measurements using separate table generations to produce the functionality of a single lookup table"; **col. 3, lines 54 – 57.** ROLLESTON refers to the resultant single lookup table as a "blended lookup table".

ROLLESTON's motivation for blending color transforms is that "one set [*of mappings*] is better than the other set *for only a portion of color space*. Thus, a desire for optimum reproduction would require that both sets of data be used"; **col. 6, lines 8 – 14.**

In **col. 7, line 1**, ROLLESTON teaches a special case of blending two lookup tables as

$$LUT_{NEW}(r, g, b) = A(r, g, b) * LUT1(r, g, b) + [1 - A(r, g, b)] * LUT2(r, g, b)$$

"where LUT1() and LUT2() are the values of the first and second LUT's at some location (i.e., r, g, b) in the table" and the _weighting function A(r, g, b)_ "is a function of the table location such that 0 <= A <= 1"; **col. 7, lines 3 – 5.**

ROLLESTON teaches that "(r, g, b)" are colorimetric values and "may be in terms of CIE color space (rgb), or the L*a*b*, or luminance-chrominance space (LC_1C_2)"; **col. 4, lines 44 – 46.** ROLLESTON further teaches that the colorimetric "color signals R_C, G_C, B_C are processed to generate address entries to a table therein which stores a set of transform coefficients with which the signals R_C, G_C, B_C may be processed to convert them to C_X, M_X, Y_X colorant signals _or any multi-dimensional output color space including but not limited to CMYK_ or spectral data"; **col. 5, lines 1 – 7.**

In addition, ROLLESTON asserts that even though a device independent color space (i.e., CIE RGB, L*a*b*, or LC_1C_2) to a device dependent color space (i.e., C_X M_X Y_X or C_X M_X Y_X K_X) conversion is described, "_the invention applies equally as well to conversions to any transformation from a first space to a second space, irrespective of the nature of the space as device dependent or not_"; **col. 7, lines 31 – 37.**

That is, the *blended lookup table*, LUT$_{NEW}$, may also have the form:

$$LUT_{NEW}(C, M, Y, K) = A(C, M, Y, K) * LUT1(C, M, Y, K)$$

$$+ [1 - A(C, M, Y, K)] * LUT2(C, M, Y, K)$$

where LUT$_{NEW}$(), L1() and L2() produce *new* C', M', Y' and K' values, and the weighting function A() is a function of the input C, M, Y and K values.

In summary, DECKER teaches a *second printing process adaptation* of *maintaining the black build-up* by constraining the black (K') color values of the second printing process to values which have the same lightness (L*) as black (K) color values of the first printing process.

FISCHER teaches the conventional *first printing process adaptation* (i.e., an *unconstrained multi-dimensional transform*; e.g., an ICC device link profile) and a *second printing process adaptation* of "maintaining the integrity of the black channel" by means of a *constrained multi-dimensional transform*. FISCHER further teaches combining the *unconstrained* and *constrained transforms*, similar to the instant application's *third printing process adaptation*, so that a "smooth transition" occurs between the two cases.

ROLLESTON teaches a method of *blending* separate color transforms by using a *weighted averaging* of the separate color transforms.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of FISCHER and ROLLESTON with those of DECKER and provide *a _third printing process adaptation_ for transforming _all_ the color values of the first printing process into additional transformed color values of the second printing process by performing a _weighted averaging_ of the transformed color values of the first printing process adaptation and of the further transformed color values of the second printing process adaptation so that a "smooth transition" could be implemented between the first and second printing process adaptations.*

In addition, DECKER *does not specifically teach*

> **carrying out the weighted averaging with a weighting function f(C1,M1,Y1) derived from a proportion of chromatic printing inks _CMY_ in colors of the first printing process;**

> **and using a function s(C1,M1,Y1) for forming the weighting function f(C1,M1,Y1), which is limited to a value range between 0 and 1,**

> **the function s(C1,M1,Y1) being a measure of an entire proportion of _only_ the chromatic printing inks CMY _without black_ in a color [[from]] _of_ the first printing process.**

As noted, ROLLESTON teaches a method of *blending* color transforms with a weighting

function A() which may be a function of the color values C, M, Y and K of the first

printing process. That is, weighting function A() is also a function of color values C, M

and Y.

Similar to ROLLESTON, BALASUBRAMANIAN teaches a method of selectively

"*blending between transforms or rendering intents*"; **abstract, lines 1 – 3.**

With reference to **Figs. 1** and **2**, BALASUBRAMANIAN teaches that a "*pictorial gamut* is

a set of colors most often used when rendering *photographs and similar images*. The

centrally located pictorial gamut includes pixels calling for *significant color mixture*.

Therefore the *centrally located pictorial gamut 174* of the first device also represents

those colors which *require careful matching* when an image that was prepared for

rendering on the first device is to be rendered on a second device"; **col. 5, lines 33 –**

40. "When rendering colors from the first device's *centrally located pictorial gamut 174*

on the second device, it is desirable to match the colors as closely as possible.

Therefore, an *emulation transform* is required when rendering these *centrally located*

colors"; **col. 5, lines 44 – 48.**

With further reference to **Figs. 1** and **2**, BALASUBRAMANIAN teaches that the "colors

that lie on the surface of the gamut cube, and particularly the *primary colors* that lie at

the corners 128 [*cyan*], 132 [*magenta*], 136 [*yellow*], 140 [*red*], 144 [*green*], 148 [*blue*],

168 [*actually, 164, black*], 172 [*white*] of the cube are those colors that are most often

used in business graphics"; **col. 5, lines 49 – 52.** "Therefore an *emulation transform*

should not be used when mapping primary colors [including black]. Instead primary

colors are said to be mapped through an *identity transform*. The identity transform does

not change the pixel values of a pixel as it is mapped to the color gamut of another

device"; **col. 5, lines 57 – 62.**

BALASUBRAMANIAN teaches the following "blending function" [**col. 8, line 45**]

$$CMYK_{BLENDED} = f(\alpha) * CMYK_{EMULATION} + (1 - f(\alpha)) * CMYK_{IDENTITY}.$$

where **CMYK$_{EMULATION}$** is the "emulation transform", **CMYK$_{IDENTITY}$** is the "identity

transform", and **f(α)** is a function that is "used to smoothly blend between an emulation

transform for pixels near the center of the gamut cube and using an identity transform

for pixels near the primary colors"; **col. 8, lines 38 – 41.**

"When f(α) has a value near zero, the term CMYK$_{IDENTITY}$ dominates. The pixel is

treated as a *primary color* and the colorant pixel values are changed very little as the

pixel is mapped from the first device's color gamut to the second device's color gamut;"

col. 8, lines 46 – 50.

"When the value of f(α) is near one, the term CMYK$_{EMULATION}$ dominates. The pixel is

treated as a *pictorial pixel* and the colorant value is modified as is required to map to the

second device's pictorial gamut"; **col. 8, lines 50 – 53.**

BALASUBRAMANIAN further teaches an equation for α [$\alpha = 2 * \min(\alpha_1, \alpha_2, \alpha_3, \alpha_4)$;

col. 8, line 20] which is a function of "normalized pixels with colorant pixel values [C, M,

Y, K] in the range of 0 to 1"; **col. 7, lines 50 – 51.**

As shown by equations (1) [**col. 7, line 55**], (2) [**col. 7, line 64**], (3) [**col. 8, line 6**] and

(4) [**col. 8, line 11**], α is a metric function of input colorant pixel values C, M, Y and K. α

is near zero "when a pixel is far from the center of the gamut cube" (or the pixel is near

a *primary color*), and α is "near one for pixels near the center of the gamut cube"; **col. 8,**

lines 35 – 37.

That is, metric function α is a "*measure of an entire proportion of the chromatic printing*

inks CMY in a color from the first printing process" that varies from 0 at the corners and

edges of the gamut cube to 1 in the center of the gamut cube.

Primary colors, *including black*, which are at the corners of the gamut cube, are

transformed with the identity transform, CMYK$_{IDENTITY}$. *That is, the primary colors are*

"maintained".

Since the metric function **α** is a function of input colorant pixel values C, M, Y and K,

blending function **f(α)** is *also* a function of input colorant pixel values C, M, Y and K.

Metric function **α** corresponds to the instant application's function **s(C1,M1,Y1)**, and

blending function **f(α)** corresponds to the instant application's function **f(C1,M1,Y1)**.

Furthermore, since each of α_1 [in **col. 7, line 55**], α_2 [in **col. 7, line 64**], and α_4 [in **col. 8,

line 11**] is a function only of C, M, and Y, each metric can be said to be an individual

"function s(C1, M1, Y1) for forming the weighting function f(C1, M1,Y1), which is limited

to a value range between 0 and 1, the function s(C1, M1, Y1) being a measure of an

entire proportion of <u>only the chromatic printing inks CMY without black</u> in a color of the

first printing process".

That is, BALASUBRAMANIAN teaches a method of providing a "smooth transition"

between the *first and second printing process adaptations* by

> ***using a function s(C1,M1,Y1) for forming the weighting function***
>
> ***f(C1,M1,Y1), which is limited to a value range between 0 and 1,***

> ***the function s(C1,M1,Y1) being a measure of an entire proportion of <u>only</u>***
>
> ***the chromatic printing inks CMY <u>without black</u> in a color [[from]] <u>of</u> the first***
>
> ***printing process.***

Therefore, it would have been further obvious to one of ordinary skill in the art at the

time the invention was made to combine the teachings of BALASUBRAMANIAN with

those of FISCHER, ROLLESTON and DECKER so that a "smooth transition" could be

implemented between the *first and second printing process adaptations* by using a

metric function α so that *primary colors*, including black, could be maintained in the

transformation from a first CMYK device to a second CMYK device while *pictorial colors*

could be *emulated*, and thereby, matched as closely as possible.

Alternatively, similar to ROLLESTON, TSUKADA teaches a method for *blending color*

conversion tables.

With reference to **Fig. 8**, TSUKADA illustrates an "input color A" being "present in two

printer color reproduction zones where K [black] is equal to **b** and where K is equal to

a"; **col. 8, lines 40 -42**. "*Theoretically*, a reproduced color **Aa** by (Ca, Ma, Ya, [K]a) and

another reproduced color **Ab** by (Cb, Mb, Yb, and [K]b) are approximately equivalent to

each other"; **col. 8, lines 50 – 52.**

TSUKADA obtains "new values (C, M, Y, K)" from "(Ca, Ma, Ya, [K]a) and (Cb, Mb, Yb,

[K]b)" by selecting a "*K [black] ink adjustment coefficient* **adk**" [**col. 8, lines 53 - 59**] and

applying equation (8) [in **col. 8, lines 61 - 65**] as presented below:

$$\begin{pmatrix} C \\ M \\ Y \\ K \end{pmatrix} = adk \times \begin{pmatrix} Cb \\ Mb \\ Yb \\ b \end{pmatrix} + (1 - adk) \times \begin{pmatrix} Ca \\ Ma \\ Ya \\ Ka \end{pmatrix} \qquad (8)$$

TSUKADA teaches that the "*K [black] ink adjustment coefficient* **adk** is a real number between 0 and 1, both inclusive"; **col. 8, lines 66 – 67**.

TSUKADA additionally teaches, with reference to **Fig. 4**, that the "black [ink] adjustment coefficient" can be "calculated from [a] *color saturation signal C**"; **col. 7, lines 25 – 29.**

Specifically, TSUKADA illustrates that the *black ink adjustment coefficient* increases as the *color saturation* decreases. Therefore, with respect to equation (8), (C, M, Y, K) approaches (Cb, Mb, Yb, [K]b) as the input *color saturation* decreases. That is, *more black ink is used*, or the black ink is *maintained* by not being replaced with equivalent amounts of cyan, magenta, and yellow.

With respect to a "luminance-chrominance" color space, such as L*a*b*, it is well-known in the art that a "*color saturation* signal" depends only on chrominance values and not on the luminance value.

It is also well-known in the art that the *black color channel [K]*, in a device-dependent CMYK color space, *in theory*, influences only the luminance of a printed image while not affecting the chrominance of the printed image.

Therefore, it is believed that it would have been obvious to one of ordinary skill in the art

at the time the invention was made to obtain the *black ink adjustment coefficient* from a

color saturation signal which, in turn, is based on non-black *cyan, magenta*, and *yellow*

color channel values.

That is, TSUKADA teaches a method of providing a "smooth transition" between the *first*

and second printing process adaptations by

> **using a function s(C1,M1,Y1) for forming the weighting function**
>
> **f(C1,M1,Y1), which is limited to a value range between 0 and 1**
>
> [*the "black ink adjustment coefficient" corresponds to function "s(C1, M1, Y1)"*
>
> *with weighting function "f(C1, M1, Y1)" being equal to function "s(C1, M1, Y1)"*],
>
> **the function s(C1,M1,Y1) being a measure of an entire proportion of <u>only</u>**
>
> **the chromatic printing inks CMY <u>without black</u> in a color [[from]] <u>of</u> the first**
>
> **printing process.**

That is, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to *alternatively combine* the teachings of TSUKADA with those of

FISCHER, ROLLESTON and DECKER so that a "smooth transition" could be

implemented between the *first and second printing process adaptations* by using a

"*black ink adjustment coefficient*" to maintain *the black color channel* in the

transformation from a first CMYK device to a second CMYK device for a lower *color*

saturation of *a color of the first printing process* while maintaining the *chromatic (cyan,*

magenta, yellow) color channels for a higher *color saturation* of *the color of the first*

printing process.

Regarding claim 3, DECKER *does not specifically teach* the method according to claim

[[2]] 1, which further comprises:

allocating a higher weighting factor to the colors of the first printing

process with a high proportion of the chromatic printing inks CMY;

and allocating a lower weighting factor to the colors of the first printing

process with a low proportion of the chromatic printing inks CMY.

As noted for claim 1, FISCHER further teaches that a "*smooth transition*"

(corresponding to the instant application's third printing process adaptation) "can be

implemented ... by interpolating between the constrained and unconstrained cases";

col. 7, lines 33 – 35.

In an example, FISCHER teaches "when a region of the source image contemplates the

printing of a single-color black, i.e., when only the K channel is specified, the 'do not add

chromatic colorants' constraint" (i.e., the black (K) channel preserving constraint) "is

applied" and "when there is no single-color black in the source image, the 'full multi-

dimensional' constraint condition is applied"; **col. 7, lines 21 – 27.** That is, FISCHER

teaches a *blended* transform composed of "black only" (i.e., K≠0, C=0, M=0, Y=0) and

"no single-color black" (i.e., K=0, C≠0, M≠0, Y≠0) cases.

With respect to ROLLESTON's teachings, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to implement a weighting function

which allocated *a higher weighting factor to the colors of the first printing process with a*

high proportion of the chromatic printing inks so that the "no single-color black"

transform would be weighted more than the "black only" transform when a color of the

first printing process contained a high proportion of the chromatic printing inks, and

similarly, implement a weighting function which allocated *a lower weighting factor to the*

colors with a low proportion of the chromatic printing inks so that the "black only"

transform would be weighted more than the "no single-color black" transform when a

color of the first printing process contained a low proportion of the chromatic printing

inks.

Response to Arguments

4.   Applicant's arguments filed **8/3/2009** have been fully considered but they are not

persuasive.

With respect to Applicant's argument regarding **claim 1** on **page 13, 3**^{**rd**} **paragraph** that

> _"The references do not lead to using a function s(C1, M1, Y1) for forming the_
>
> _weighting function f(C1, M1, Y1), which is limited to a value range between 0_
>
> _and 1, the function s(C1, M1, Y1) being a measure of an entire proportion of_
>
> _only the chromatic printing inks CMY without black in a color of the first_
>
> _printing process, as recited in claim 1 of the instant application"_

has been considered.

In reply:

It is respectfully submitted that the previously applied prior art reference,

BALASUBRAMANIAN [US Patent 6,744,534 B1], can read on the amended

claim limitations.

As noted in the rejection, BALASUBRAMANIAN further teaches an equation for α

[$\alpha = 2 * \min(\alpha_1, \alpha_2, \alpha_3, \alpha_4)$; **col. 8, line 20**] which is a function of "normalized

pixels with colorant pixel values [C, M, Y, K] in the range of 0 to 1"; **col. 7, lines**

50 – 51.

Since each of α_1 [in **col. 7, line 55**], α_2 [in **col. 7, line 64**], and α_4 [in **col. 8, line**

11] is a function only of C, M, and Y, each metric can be said to be an individual

"function s(C1, M1, Y1) for forming the weighting function f(C1, M1,Y1), which is

limited to a value range between 0 and 1, the function s(C1, M1, Y1) being a

measure of an entire proportion of <u>only the chromatic printing inks CMY without</u>

<u>black</u> in a color of the first printing process".

Allowable Subject Matter

5.   Per the previous office action and the subsequent claim amendments, **claims 5**

and 6 are allowable.

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure:

- **OKUYAMA [US Patent Application 2004/0061880 A1]** teaches a *"weighting*

   coefficient is set for a pixel based on the values of the CMY data for the pixel.

   A particular region in which the pixel is located is identified as a black color

   region or a non-black color region. The value of the K data for the pixel is

   altered based on the weighting coefficient if the particular region is a non-

   black color region"; **page 1, paragraph 5, lines 6 – 12.**

7.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter L. Cheng whose telephone number is 571-270-3007. The examiner can normally be reached on MONDAY - FRIDAY, 8:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark K. Zimmerman can be reached on 571-272-7653. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/plc/
November 6, 2009

/Mark K Zimmerman/

Supervisory Patent Examiner, Art Unit 2625